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ABSTRACT

General theory of transfer of knowledge and skill in learning second languages and ways in which language awareness may contribute to second language learning are examined. It is concluded that while recent second language acquisition research work and theories do not support or refute transfer of general language principles to the learning of specific languages, some ideas drawn from general and second language learning theory should be subjected to empirical testing. It is noted that (1) theories emphasizing the role of language universals and native language acquisition in the learning of second languages do not address the value of explicit teaching of those universals, (2) stimulus-response theories generally do not address the role of general language principles in second language learning, and (3) the cognitive approach implies strongly that general principles are involved at all stages of learning, in different forms according to the subject matter and student characteristics. Finally, it is argued that language awareness is a justifiable element of the curriculum despite the lack of specific theoretical or empirical support from the field of language learning. (MSE)

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S H McDonough

This paper is intended to contribute to the language awareness debate by exploring what can be extrapolated from the general theory of transfer of knowledge and skill in learning second and foreign languages, in the belief that how people learn and how people apply what they have learned to new areas is an important factor in any discussion of teaching languages and about language. Naturally, it is written from an exploratory point of view and is not committed to any particular position, for example that language awareness training is either a necessary prerequisite for foreign language learning, or a necessary consequence of that, or an activity that cannot stand in its own right as an important component of a school curriculum. Such considerations are more properly the subject of other contributions to the Working Party.

There are several relevant questions in which a psychology of transfer of knowledge and skill might be useful. Probably the most important for present concerns is the likelihood that some kind of training in the general nature of language might beneficially influence the acquisition of foreign languages. A secondary question arising from that concerns the nature of the training, whether it be in general principles, in direct experience of learning foreign languages, or in sensitivity to the mother tongue. Another question (which this paper can hardly address) would concern the likelihood that explicit training in language per se would benefit the mother tongue and other subjects to be learned at school. However, at present the general understanding of the process of transfer of training is so limited as to make these wider questions unanswerable. This short paper must be restricted to statements that can be made relevant to the first question. Broadly the paper will fall into three sections. Firstly, some classical notions of transfer and generalisation will be looked at. Secondly, some more recent work on cognitive principles will be reviewed in the light of the main question above. Thirdly, some current second language development theories will be examined to see what predictions concerning transfer can be made from them.

The notion of transfer of training in classical learning theory was encompassed in two general areas of experimentation and theorising: generalisation of responses (or stimuli) and interference between different learning tasks. 'Generalisation' refers to the chances of a learner transferring a response which has been learned in connection with one stimulus to a new stimulus, or learning that two responses are appropriate to the same stimulus. Both of these found their way into language teaching via general educational psychology but also more particularly through the assumptions of the audio-

lingual approach. Briefly, a typical generalisation experiment would involve training an animal to go to the white side of a T maze rather than the black side. Put into a differently painted T maze with light grey and dark grey arms it would highly probably go to the light grey side, rather than run about at random. A graph of the "gradient of generalisation" could be plotted if the probability of choosing that arm were drawn against the degree of difference between the original white arm and the new more or less grey arms. The obvious assumption is that the likelihood of the animal making any particular choice is directly related to the degree of similarity that exists between the original stimulus it was trained to and the new stimulus that animal is exposed to. What the behavioural scientists were unable to specify was how the notion of similarity was represented: that is to say, why the animals were able to class and rank environmental stimuli in some kind of order of similarity without training, while at the same time claiming that all intelligent behaviour was learned by a process of training by reinforcement. The well known experiments on "interleaved" learning tasks involved learning a task, perhaps a set of nonsense syllables or a list of independent words, or a particular manipulation of some equipment, then learning a second one. If, when tested again on the first task, there was an influence on time or errors from the second, 'retroactive interference' was said to have taken place. If, when tested again on the second task, there was an influence from the first, 'proactive interference' had taken place. Both of these examples of transfer of training could in principle be beneficial (positive) or interruptive (negative) when compared to learning the tasks in isolation. The general principle which both kinds of experiment seemed to support was that transfer of training takes place in proportion to the number of elements which are identical in each task, or the proportion of each task which is covered by the same principle of organisation. Thus transfer was seen in terms of physical similarity of the tasks (The law of Identical Elements) or the organisational similarity (the transfer of principles). While these have been very influential ideas, they have not gone unchallenged. As well as the theoretical vacuum that surrounds the notion of 'similarity', it has been shown by Tulving (1966) that in verbal learning, it is by no means the case that transfer occurs in proportion to the number of identical elements. In fact if a list of nine words are learned, and then a list of eighteen including those nine are learned, memory for the eighteen is worse than if a list of eighteen quite different words had been learned. With half the second list being identical with the first, learning should have been facilitated. The explanation must be that learning the nine old plus nine new words was made more difficult because of the subjective organisation the nine old words were already embedded in, which had to be 'unlearned' or at least considerably modified to accommodate nine new words. For these reasons we cannot continue to base teaching on assumptions about transfer of training derived from classical behaviour theory.

The more recent literature on skill acquisition and information processing in cognition has produced some interesting indicators, but it remains true that little of this literature has been devoted to the question of transfer of training. The skill acquisition literature has usually concentrated on particular skilled activities, very often in applied contexts such as training aircraft pilots or plant supervisors (eg studies of motor co-ordination and vigilance under stressful conditions) and has therefore not been extended often into areas of possibly related degrees of complexity like learning linguistic rules. Walford's (1968) book remains a classic introduction to the field, and his comment that skill acquisition studies have tended to look at ancient questions such as 'massed' learning of large chunks or 'distributed' learning with rests, the order of learning simple and complex tasks, the learning of anticipation, timing, and integration of the component parts of a skill is still true. If language learning is related, at least by analogy, to motor skills, then the finding that in learning two tasks of different difficulty, doing the more difficult first (p.311) shortens the total learning time for both compared with doing the easier one first, is an instructive one both for syllabus design and for the relationship between learning about language and learning languages. However, these perhaps unexpected results may well one day be directly usable in language teaching; their relevance to that long process has not yet been adequately tested.

In the area of cognitive processing much interesting work has arisen out of the re-adoption in psychology of the notion of a 'schema' (Bartlett, 1932). This comparatively old idea received a new lease of life when it was found to be a useful explanatory concept for results which showed that in learning information expressed in language - comprehension experiments with sentences and connected prose texts - people typically used some form of cognitive organisation at a more abstract and general level than linguistic structure. The use of a such a level - usually called a schema (script and frame are alternatives) - enables people to relate information from different sources (in the experiments, different sentences) to some common organisation and therefore both to make inferences about information not present to them and to make prediction about relationships and facts that are strictly beyond the information given. Therefore this schema approach potentially offers a great deal to the understanding of transfer of knowledge, since knowledge is seen as a structured level of representation of particular areas of experience. One example of this kind of work we owe to Thorndyke and Hayes-Roth (1979), who investigated the use of schemata in the acquisition and transfer of knowledge. Their experiment concerned the degree of transfer of knowledge, measured by accuracy of recall, from training texts to test texts. Where the test text was of the same form but one component was changed, accuracy of recall was high, indicating use of the underlying form of the information in the training texts as a schema for

assimilating the test text; when training and test texts were formally unrelated, overall accuracy was low. It is important to note, however, that these authors were using only very simple texts ("This constellation was first recorded at Mount Palomar observatory") in one of the experiments and only slightly less simple stories in their second, in the interests of being quite explicit about the knowledge structures constructed; it would be dangerous to extrapolate from these experiments to the much larger knowledge structures and much longer time spans involved in school language learning programmes.

A development in educational psychology which interestingly parallels the use of schemata as a theoretical tool in cognitive studies or psycho-linguistics is provided by the work of G Pask (1976, and see N Entwistle, 1978). In what Pask calls 'Conversational Techniques' - in computer aided instruction - is the operation of a rather rigid schema which he calls an 'entailment structure', which is an analysis of the topic to be learned reconstructed as an arrangement of sub-topics with logical relations between them which provides a 'map' for the student to guide his understanding of the subject matter. It can be tailored to particular student differences like preferences for large chunks or small steps. Entwistle comments that it seems more adaptable for science learners than for arts learning. However, in the present context Pask's work seems worth examining not specifically for its possible use as a teaching method but for the obvious underlying assumption that learning - which for him subsumes understanding - proceeds by way of logical steps derived from the internal structure of what is to be learned (and not, as in a Skinnerian learning programme, from a rather arbitrary and empirical breakdown into the smallest learnable steps). It would be very interesting to test if language(s) learning might benefit from a similar concern with the 'entailment structures' of the general theory of language. However, there is one finding in the transfer of learning literature that casts doubt on the universality of transfer, even if a Pask-like teaching system could be set up. Sullivan and Skanes (1971) showed that transfer of training was much greater in 'bright' 9 - 12 year olds than in 'dull' ones, where intelligence was measured on one of the Otis tests and the tasks were simple letter series problems. It is of course not particularly surprising that bright children should see connections and perceive parallels between otherwise dissimilar tasks or facts better than dull children, but it is a warning about individual differences in children that cannot be forgotten. It is also not an isolated finding. Gagne and Pardise (1961) had found a similar result.

It is possible to derive predictions about transfer from several recent and current approaches to second language development; the weight to be given them depends on the strength of the evidence supporting the theory in general.

The proponents of habit-formation theory drew out of stimulus/response theory the concept of positive and negative transfer, and generalisation and discrimination learning. It is possible to view the standard language teaching syllabus as training sequences of generalisation and discrimination learning as each new grammatical item is introduced, developed, and then given limits of applicability by contrast with another item. Generalisation however was strictly in terms of analogy: little attempt was made to get the student to induce general principles from the language data, and indeed it became a precept to "teach the language, not about the language". There was also no suggestion that one might teach about language either in the process of or as a means to teaching proficiency in a language. Jakobovits (1970) explored the extant literature on transfer between languages and the 'extrapolation of knowledge' (Chap. iv) and came to the pessimistic conclusion that transfer effects were highly complex and not at all as simple as the audio-lingualists' espousal of constrastive analysis would lead one to suspect. However he comments interestingly at the end of his section on teaching generalisations:

"I would like nevertheless to suggest that in language learning we can maximise transfer effects by concentrating in the early stages on the acquisition of general principles and only later should we worry about automatisation of phonological habits, fluency, and correct pronunciation. (Note that this is the reverse of audiolingual practice.)" (1970, p.216)

Predictions that are perhaps more in accord with Jakobovits' suggestion can be derived from hypothesis testing theory, sometimes known as 'cognitive code' learning theory. Incidentally, Jakobovits himself suggested that this kind of theory was more appropriate to second language learning than to first language acquisition. In most forms of 'cognitive' theory, languages are thought to be learned by a process of creation and elimination, by negative feedback, of alternative hypotheses about the structure underlying a set of examples of the language. J Bakin (1973) presents a well worked out scheme for guiding this hypothesis testing activity. In general educational psychology such hypothesis testing guidance systems have been labelled 'discovery methods'. The role of transfer of general principles of language or of general experience with languages, in such a theoretical approach, is clear: it is in the students' initial creation of hypotheses about the structure and conventions of the new language. The richer the hypothesis formation process can be, the greater the ease with which new structural devices can be understood and 'internalised'. It is this kind of theoretical approach that supported the great amount of work in Error Analysis performed in recent years. However, not all theorists are agreed that negative feedback on formulated hypotheses is the main driving force in language learning: people do not only progress from example

to rule to proficiency but sometimes from example to proficiency (by feel) to statable rule.

From a less 'cognitive' point of view, Stern suggested (1974) that good language learners might be distinguishable from unsuccessful ones in terms of a set of strategies for learning which they seem to adopt unbidden. One of these was the use of "technical know-how about how to tackle a language". The obvious suggestion is that that kind of knowledge can be taught, both with reference to the first language, and with reference to other languages. In the empirical project at O.I.S.E. which arose out of this approach (Naiman Frohlich, and Stern, 1975) that particular strategy was 're-distributed' in a new formulation, but the central idea was still there, and was found to be supported by the interview data which they collected. In this connection it is probably signficiant that in the various tests of language aptitude that are available, the most robust predictors are those which are most obviously "language-knowledge" tests, like the test of grammatical sensitivity in the MLAT (Carroll and Sapon, 1959) and the exotic language learning task and the mother tongue vocabulary task in the LAB (Pimsleur, 1968).

The idea that second language learning was more closely related to first language acquisition than suggested by, for example, Jakobovits or Dakin, became a popular one as evidence was compiled which seemed to show either that learners' sequences of mastery of grammatical items were the same as native childrens' or that while different from native childrens' they were still apparently independent of teaching syllabus and thus were 'natural hierarchies' or 'natural orders' of difficulty. Dulay and Burt (1974) suggested, to explain their results on the consistency of the order of acquisition of grammatical morphemes, that there was a 'creative construction' process which essentially is the re-activation of the innate mechanisms which construct grammars for children acquiring the native language. It therefore allows the real possibility that innate knowledge of universal principles of languages, for example, the subject-predicate distinction, are brought to bear directly on the development of second language proficiency. However, its proponents have not attempted to assess the effectiveness of training in awareness of such principles.

The general nature of language acquisition would argue for there being no conscious component in the use of universal principles of language, and therefore no role for explicit training in awareness of them; however no test has been performed of this attractive possibility.

Perhaps the most controversial current theory is that of Krashen (1981) in which strong assertions are made about the relationship, in second language learning, between first language-type processes

("acquisition") and conscious rule-learning in constrained teaching environments ("learning"). In his theory, knowledge of language per se would affect proficiency in two ways; unconsciously through "acquisition" and consciously through the formation and evaluation of rule systems and language features as in "learning". However, it seems impossible for Krashen's model to allow language awareness training to affect acquisition because he states that this is unconscious. One criticism levelled at his "Monitor" theory is that it does not allow "seepage" from consciously learned knowledge to unconscious sensitivity; if this possibility is allowed for (as argued by Stevick (1980) Chap. 21), then "acquisition" can benefit both from first language development processes and other experience of the general nature of language. Krashen himself, however, would strongly resist this idea, because it diffuses the sharp distinction he wishes to draw between acquisition and learning. In fact he further subdivides learning into learning 'rules of thumb', which are the contents of the 'monitor' which checks on the output of the model, and thus the accuracy of the learner's productions, and learning about the structure of the language, which he sees as an optional, interesting 'extra', a kind of language appreciation class, which has no role to play in the actual process of developing proficiency. As an afterthought, he adds (1981, p.118, note 3) that teaching structural rules may give confidence to students who have developed proficiency but do not have confidence in their 'acquired' ability.

In conclusion, it is evident that the work briefly reviewed above cannot be used to support or refute any particular about transfer of knowledge of general principles of language to or from experience of particular languages. It is possible to draw out predictions from schema theory and from various current second language learning theories; they are as yet untested and in any case subject to the fate of the base theories in the testing ground of empirical research. Those theories that emphasize the role of universals and the first language acquisition process in second language development are silent on the role of explicit or school-like teaching of awareness of those universals. The hypothesis testing and stimulus-response theories are silent (largely) on whether transfer could occur only from previous experience of language learning or from general principles of language. The 'cognitive' approach of Pask implies strongly that general principles are involved at all stages of learning, in different forms according to the subject matter and the student characteristics.

However, this interesting area is ripe for a concerted empirical attack and the nature of transfer in these circumstances will remain a matter for vigorous debate in the discussion of second and foreign language learning and teaching. It should be evident from this brief review that several important questions remain open. For example, it should not be supposed that enhanced ease of learning foreign

languages cannot result from transfer of principles from language awareness courses. Indeed the current activity in such courses may well provide positive evidence for this possibility. Equally, the conditions under which transfer has been shown to operate are relatively restricted. However, the possibility of transfer to practical proficiency cannot weaken the claim that Language Awareness courses are justifiable in their own right as part of the curriculum.

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